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ATLAS  
OF  
PATHOLOGICAL ANATOMY  
ILLUSTRATIVE OF  
A CLINICAL TREATISE  
ON  
DISEASES OF THE LIVER

BY  
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COUNSELLOR, AND MEDICAL ADVISER TO THE MINISTRY OF PUBLIC INSTRUCTION AND MEDICINE AT BERLIN.

PART II.  
ILLUSTRATED BY FOURTEEN CAREFULLY COLOURED STEEL-PLATES.

TRANSLATED AND EDITED  
BY  
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EXPLANATION OF THE PLATES.

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# PLATE I.

## HYPERÆMIA, INFLAMMATION AND ABSCESS OF THE LIVER.

Fig. 1. Hyperæmia of the Liver, with extravasation of blood into the parenchyma and beneath the capsule.

Fig. 2. Diffuse and circumscribed inflammation of the liver.

The cut surface of the organ is of a pale yellowish-red colour, glistening and œdematous. The lobules are coloured reddish in the centre, and pale yellow at the margin, and are surrounded by a grey rim from which serum flows out. Scattered through the gland are pale patches, raised above the surrounding level, in which the pale lobules are of larger size, and their rims broader, than in the other parts of the gland. Accumulations of ochre-yellow bile-pigment may be observed towards the centre of these patches; one of them is infiltrated with blood and in its centre is a twig of the portal vein filled with coagulated blood.

Fig. 3. A circumscribed mass of exudation in the liver, undergoing retrograde metamorphosis; amyloid degeneration of the hepatic cells and connective tissue-corpuscles in its interior.

At the margin of the normal tissue, a branch of the hepatic artery is observed surrounded by its sheath at *a*; it is accompanied by a twig of the portal vein distributing its capillaries, as in the normal state, between the secreting cells, which contain a large amount of pigment.

The artery is immediately bounded at *b* by a broad layer of crude connective tissue, with elongated oval, sometimes spindle-shaped, but never branched, connective tissue-corpuscles. In this layer, isolated hepatic cells, of a very hyaline lustre, and exhibiting neither nucleus, nor granular cell contents, may be observed arranged in rows at *\**; they assume a dark red colour on addition of solution of Iodine. A similar reaction is presented by the adjoining connective tissue-corpuscles. Further on, the elementary structures cease to present this character, and the isolated hepatic cells and corpuscles contain fine granules and oil-globules.

At *c*, those oil-globules and granules are larger and more numerous, and the tissue presents in consequence an opaque appearance.

At *d*, the connective tissue-corpuscles are undefined; but even here may be recognised the outlines of isolated hepatic cells filled with oil, and here and there may also be seen the outlines of ramifying vessels.

Fig. 4. Crystals of Tyrosine, from the evaporated urine of a patient who died of diffuse Hepatitis (Case of Selinsky, Observation Nr. 1).

Fig. 5. Kreatine from the same urine.

## PLATE II.

### CIRRHOSIS OF THE LIVER—GRANULATIONS RESULTING FROM DEPOSIT OF FAT.

Fig. 1. Section of a cirrhotic liver: natural size.

Broad rims of connective tissue are seen separating large and small groups of lobules, which are again subdivided by narrower streaks. The outer surface of the organ is of a nodulated character.

Fig. 2. Granular outer surface of another cirrhotic liver. The size of the nodules varies from that of a poppy-seed to that of a pea. Between them may be observed ramifications of blood-vessels containing black pigment.

Fig. 3. A section of the same liver, magnified eight diameters. The portal vein is injected with red material; the fine ramifications of the hepatic artery are filled for the most part with black pigment.

Fig. 4. Another case of finely-granular cirrhosis, magnified eight diameters. The portal vein is injected with yellow material; the hepatic artery with blue; and the hepatic veins with red.

In the rims of connective tissue, separating the groups of lobules from one another, a network of vessels with elongated meshes, is observed; this network was filled with the material injected into the portal vein, but differed entirely from the ordinary mode of distribution of this vessel: interspersed through this network are elongated twigs of the hepatic artery. The hepatic vein is injected at some places as far as its finest capillaries; but at many places the injected material has become extravasated.

Figs. 5, 6 and 7. Granulations of the liver produced by Fatty-degeneration of the organ.

The cells filled with oil in the part of the lobules adjoining the portal vein, project in the form of granules, above the surrounding level.

Figs. 5 and 6 represent sections of such a liver, magnified eight diameters. In Fig. 5, the branches of the portal vein injected with red material may be observed in the centre of the yellow prominences, whilst the hepatic veins injected with a green substance are seen in the depressions. In cirrhosis the relation of the parts is reversed.

In Fig. 7, the relations of these parts may be observed more completely. The yellow branches of the portal vein lie upon the summit of the granulations, accompanied by twigs of the hepatic artery filled with blue material and surrounded by hepatic cells loaded with oil. In the encircling furrows the red twigs and capillaries of the hepatic veins may be observed surrounded by cells, containing a large quantity of pigment. A new formation of connective tissue, which characterizes true cirrhosis, is here for the most part wanting.

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## P L A T E III.

### CIRRHOSIS OF THE LIVER. THE CHANGES WHICH TAKE PLACE IN THE VASCULAR APPARATUS AND IN THE MINUTE STRUCTURE OF THE LIVER.

Fig. 1. Advanced Cirrhotic Degeneration. The portal vein is injected red and the hepatic artery yellow.

The lobules of the liver are separated from one another by broad bands of connective tissue. Some of the lobules are more or less completely destroyed, whilst groups of others remain tolerably normal. These last still exhibit at *a*, the original capillary arrangement, which at *b, b*, is in a great measure destroyed and its place supplied by a vascular network with elongated meshes, in the strata of connective tissue. Close to the red branches of the portal vein, large twigs may be observed of the yellow hepatic artery, the most of which at *c*, contain a quantity of black pigment. Similar dark pigment is seen in certain of the hepatic lobules, as resulting from old extravasations of blood, while other lobules contain an abundance of bile-pigment.

Fig. 2. Cirrhotic Degeneration of a high grade. The portal vein is injected yellow; the hepatic vein, red; and the hepatic artery, blue.

Groups of three, five and eight hepatic lobules are separated from one another by broad bands of connective tissue, in which the remains of the disintegrating gland-tissue and an extensive network of bloodvessels may be distinguished. The latter consist, for the most part, of elongated tortuous vessels, most of which are injected from the hepatic artery, and others are filled with the coloured material injected into the portal vein. The twigs of the hepatic artery contain black pigment at many places. This vascular apparatus, as well as the connective tissue in which it is imbedded, is for the most part a new formation and the former differs essentially in its mode of distribution, from the branches and capillaries met with in the normal liver. The normal arrangement of vessels is only observed, where the glandular tissue remains intact; here may be seen vascular meshes which enclose the hepatic cells and which are injected partly from the portal vein, partly from the hepatic vein, and at certain places also from the hepatic artery.

Figs. 3 and 4. Microscopic examination of the connective tissue of an indurated cirrhotic liver.

Fig. 3. The thickened peritoneal envelope (*a*) consists of a tissue resembling fibro-cartilage, the matrix is hyaline in fine sections, while thicker sections exhibit a fibrous

appearance. The fibre-cells are elongated, elliptical and spindle-shaped; the nucleus is not distinct and many of the cells contain a large number of oil-globules. The cells at some places are densely aggregated in straight lines and at others are distributed in curves, while at other places they are separated from one another by broad bands of a hyaline matrix.

The connective substance in the region of the former glandular parenchyma resembles amorphous or crude areolar tissue; the matrix is granular and sometimes indistinctly striated; the cells are rounded, oval, or elliptical and the nuclei ill-defined.

The tissue enveloping the sheath of the portal veins (*e*) consists of a gelatinous connective substance with stellate cells. *d*. The wall of the vessel. *f*. A Nerve.

Fig. 4. A portion of the disintegrating glandular tissue, with the remains of isolated hepatic cells in the amorphous connective substance. Some of the capillaries are injected red from the hepatic vein. At the margin may be observed the sheath of a branch of the portal vein accompanied by a bile-duct *a*.

## P L A T E   I V .

### FINELY-GRANULAR CIRRHOSIS IN CONJUNCTION WITH FATTY DEGENERATION. INDURATION OF THE LIVER.   SYPHILITIC INFLAMMATION AND CICATRICES.

Fig. 1. Finely granular cirrhosis. The lobules of the liver are in a state of fatty degeneration and are surrounded by tolerably broad rims of connective tissue in which is imbedded a network of vessels with large meshes, which is injected, for the most part, yellow from the portal vein, and at *a* is injected blue from the hepatic artery. The injection has only penetrated sparingly into the glandular tissue. The normal capillary distribution is only observed at one place (*b*) where there are still healthy hepatic cells loaded with pigment; it is also seen at *c*, where the red injection has penetrated into the capillaries of the hepatic veins. *d*, is the hepatic artery enveloped in its sheath.

Figs. 2 and 3. Induration of the Liver. The outer surface of the Liver in Fig. 2, presents broad rounded elevations, and in Fig. 3, large nodulated protuberances.

In Fig. 2, there may be observed extending from the external capsule, to a greater or less depth into the parenchyma, processes of dense connective tissue, interspersed through which in a regular manner are brown dots, constituting the remains of the former glandular tissue. This connective tissue which is also found at same places isolated in the midst of the parenchyma, is abruptly defined from the surrounding glandular substance. Glisson's capsule, accompanying the branches of the portal vein and bile-ducts, is considerably thickened, and at certain places is directly continuous with the newly formed connective tissue of the indurated parts of the liver.

Fig. 3. Another portion of the same liver. The outer surface is here partly smooth and even (*a*), and partly covered with deep fissures and nodulated protuberances (*b*). In the right lobe, the induration penetrates only one or two lines from the capsule into the interior of the parenchyma; but in the left lobe it extends throughout the entire thickness of the gland. In the midst of the uniformly indurated mass may be seen the isolated remains of the incompletely disintegrated glandular tissue. The vessels and especially the bile-ducts of the indurated parts are dilated, like the bronchi of an indurated lung.

Figs. 4, 5 and 6. Fig. 4. Circumscribed yellowish-white deposit in the liver of a person, who had suffered from syphilis. It is situated at the surface, where it is sharply defined from the surrounding congested tissue. It is of dense consistence and consists of connective tissue with

elongated fibres infiltrated with a crumbling amorphous material, nuclear formations and oil globules (Fig. 5). The interior of the nodule is penetrated by the ramifications of bloodvessels, and also exhibits soft yellowish-green patches. In these softened portions, numerous hepatic cells, partly loaded with pigment, and partly in a state of fatty degeneration may be observed in addition to the amorphous debris.

Fig. 7. A dense cicatrix extending inwards from the external surface to the extent of half an inch; also from the liver of a person who had suffered from syphilis. Numerous open orifices of bloodvessels may be seen in its interior.

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## P L A T E V.

INDURATION OF THE LIVER OF AN ADVANCED GRADE; DEPOSIT OF PIGMENT IN THE BLOODVESSELS, THE GLANDULAR PARENCHYMA AND THE CONNECTIVE TISSUE, RESULTING FROM OBSTRUCTION TO THE CIRCULATION, IN CONSEQUENCE OF PARTIAL CLOSURE OF THE HEPATIC VEINS. LOBULATED LIVER.

Fig. 1. Indurated Liver, magnified 40 diameters. In the first place, the capsule may be observed on the outer surface, much thickened and containing elongated fibre-cells. It is remarkable how the substances injected into the vessels have nowhere penetrated into the capsule. Beneath the capsule, and taking the place of the glandular parenchyma, is an amorphous connective tissue, with numerous branches of bloodvessels, and enclosing at many places the remains of the disintegrated gland-tissue. In the centre, is a twig of the portal vein, accompanied by several branches of the hepatic artery, nerve fibres, and a large bile-duct, enveloped in a thick sheath of gelatinous connective substance. The vessels of the indurated gland, which for the most part are injected red from the portal vein, and partly yellow from the hepatic artery, form almost everywhere large elongated meshes; it is only where the remains of the gland cells are still visible, that indications are observed of the normal arrangement of the capillaries. Most of the vessels, from their running in a direction, corresponding to that of the fibres of the connective tissue, are obviously of recent formation.

Figs. 2, 3 and 4. Different portions of the same liver, magnified three diameters.

Fig. 2 represents the connective tissue, containing a vascular network with elongated meshes. It is only at the margin, that the original capillaries can be seen injected.

In Fig. 3, may be observed round, brown-coloured remains of the glandular tissue, together with large branches of the hepatic artery and portal vein.

In Fig. 4, these remains of the glandular tissue are more numerous and are coloured partly blue and partly red, from the extravasation of blood-pigment.

Figs. 5 and 6, represent more accurately the mode of distribution of the pigment. In Fig. 5, the connective tissue and the glandular substance may be observed infiltrated with blood-pigment which has undergone but little alteration. In Fig. 6, the pigment may be observed to have undergone further metamorphosis; the vessels, and to a certain extent likewise the hepatic cells,

are filled with brown or black pigment; ochre-yellow bile-pigment may be seen in some of the lobules of the gland.

Fig. 7. Lobulated Liver. Strips of connective tissue proceed from the external capsule inwards into the interior of the liver, separating individual lobules, or more commonly large groups of lobules, from one another. In the cut surface, the portal vein (red) may be observed enveloped in its sheath, together with the hepatic artery (yellow), and two bile-ducts.

## PLATE VI.

### TELANGIECTASIS OF THE LIVER.

Fig. 1. Right lobe of the liver, with a sharply-defined, wedge-shaped, erectile tumour extending from the outer surface into the parenchyma; natural size.

Fig. 2. A section through such a tumour magnified 50 diameters.

At the margin of the tumour may be observed large bands of crude connective tissue, enclosing here and there the remains of the brownish hepatic parenchyma. This connective tissue, in the direction of the tumour, breaks up into a network of large and small trabeculae, forming meshes, which are filled with coagulated blood. Some of these meshes are nothing more than small streaks, while others present themselves in the form of large, round, oval or irregularly shaped, hollow spaces. The substance injected into the portal vein has penetrated into most of the meshes, and has separated the coagulum from the external wall. In the midst of these hollow spaces, may be observed isolated remnants of the hepatic tissue, in a state of fatty degeneration.

Fig. 3. Section through another form of Telangiectasis of the Liver. The hepatic artery is injected red.

The surrounding hepatic tissue is in a state of fatty degeneration. Isolated hollow spaces, filled with coagulated blood, and all of them surrounded by a rim of connective tissue, may be observed in the neighbourhood of the larger tumour. The meshes in the latter resemble those of Fig. 2; but the trabeculae are smaller and their capillaries have been injected red from the hepatic artery. In its centre is seen a round, compact mass of connective tissue, containing peculiar configurations, resembling the ramifications of blood-vessels.

Fig. 4. Two erectile tumours, lying in the immediate neighbourhood of the wall of the hepatic vein. The hepatic artery is injected red, and the injected matter has passed into the vasa vasorum, and into the trabeculae of the tumour.

Fig. 5. A portion of one of these tumours, magnified 50 diameters, showing its margin, where it is bounded by the liver.

Fig. 6. Another portion, also magnified 50 diameters, showing the relation of the new formation to the adjoining vascular wall.

## P L A T E VII.

### CANCER OF THE LIVER.

- Fig. 1. Cancer of the Liver, with cancerous infiltration of Glisson's capsule surrounding the portal vein.

The branches of the portal vein and likewise the bile-ducts pass through the cancerous mass, without any diminution of their caliber.

- Fig. 2. Cancer of the Liver, undergoing atrophy.

The outer surface of the cancer is marked by cicatrix-like depressions. The vessels of the capsule and particularly the veins are dilated. The cancer is covered with grey nodules, the size of a pea.

- Fig. 3. A portion of the cancer, represented in Fig. 1, magnified 8 diameters. The portal vein is injected yellow and the hepatic vein red. The grey cancerous mass is seen to contain only isolated branches of both these vessels.

- Fig. 4. Microscopic structure of the same cancerous deposit.

Glisson's capsule is observed in the middle of the new-formation, much thickened and containing stellate fibre cells. It envelopes branches of the portal vein (injected yellow), bile-ducts, nerves and an artery (injected blue). Surrounding the capsule, the cancerous matter is seen stretching into the hepatic parenchyma. The hepatic cells are seen to be gradually becoming destroyed, owing to the pressure of the growing cancerous mass upon the periphery of the lobules. Normal glandular tissue may still be seen at the right upper margin of the preparation; here the normal capillary arrangement is still observable in consequence of the injection of the portal and hepatic veins, which is no longer distinguishable in the interior of the cancerous deposit.

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## P L A T E V I I I.

### C A N C E R O F T H E L I V E R.

Fig. 1. Extensive cancerous deposit in the liver undergoing softening. The portal vein is injected yellow; the hepatic vein, red; and the hepatic artery, blue.

Numerous round and oval meshes are observed, filled with cancer cells which are undergoing fatty disintegration. The intervening walls, by which the hollow spaces are separated from one another, consist partly of connective tissue, and partly of broad or narrow strips composed of remnants of the hepatic cells (*b*). Numerous branches of the injected (blue) hepatic artery permeate the bands of connective tissue; the injected matter has penetrated into the interior of the hollow spaces and has here at many places become extravasated. The capillaries of the portal vein, which are injected with a yellow material, and likewise the branches of the hepatic vein, are only observed where the hepatic cells are still distinguishable.

Fig. 2. A portion of the same liver magnified 8 diameters.

In the upper part of the figure are seen the appearances of commencing cancerous infiltration. Between the insulated remains of the hepatic tissue, broad grey rims may be observed, which correspond to the circumference of the lobules and which contain numerous large branches of the portal vein (red) and likewise of the hepatic artery (yellow). These bluish-grey rims are still visible, where the hepatic tissue has completely disappeared and is replaced by greyish-white cancerous matter. There appears to be the same frame work of connective tissue in the cancer as in the normal hepatic substance. At those places, where the last traces of the hepatic cells have disappeared, branches of the portal vein, capable of being injected, have also ceased to exist, whilst large branches of the hepatic artery are still visible. At one place, the yellow matter injected into the hepatic artery has become extravasated into a hollow space filled with soft cancerous matter.

Fig. 3. Hæmorrhagic Cancer.

Numerous extravasations of blood, separated from one another by whitish septa may be observed in the interior of the cancerous nodule. Branches of the hepatic artery injected red are seen in the interior of the cancerous matter. Close to the cancerous deposit, the injection is seen to have passed from the artery into some of the branches of the portal vein.

## P L A T E IX.

## CANCER OF THE LIVER.

- Fig. 1. Medullary Cancer of the Liver, which penetrated the capsule, and gave rise to hæmorrhage into the abdominal cavity.
- Fig. 2. Cysto-carcinoma of the Liver, supervening after removal of an epithelial Cancer from the heel.
- Fig. 3. Hæmorrhagic and Melanotic Cancer. The hepatic artery is injected red; numerous branches of this vessel may be seen in the interior of the cancerous nodules.
- Fig. 4. Cancer of the Bile-ducts. The mucous membrane of the hepatic duct is covered with numerous flat nodules of Cancer.
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## P L A T E X.

### WAXY, LARDACEOUS, OR AMYLOID DEGENERATION OF THE LIVER.

- Fig. 1. Section of a waxy liver, with deposit of fat in the vicinity of the branches of the portal vein.
- Fig. 2. A portion of the same liver, magnified 8 diameters. The portal vein is injected red.
- Fig. 3. A portion of another waxy liver magnified 8 diameters. The portal vein is injected red and the hepatic veins, green. The capillaries of both veins are well filled. The circumference of the hepatic veins appears pale-yellow; the region corresponding to the portal vein is of a brownish hue.
- Fig. 4. A fine section of the same liver magnified 150 diameters, and moistened with solution of Iodine. The red tint of the waxy matter extends over the entire area of the lobule, but it is most decided in the immediate vicinity of the hepatic veins. In this last locality an abundant deposit of oil globules may be observed in the interior of some of the cells.
- Fig. 5. A portion of another waxy liver moistened with solution of Iodine, and showing an isolated deposit of waxy matter.
- Fig. 6. Rounded and oval grey bodies in the cirrhotic, waxy liver of a person who had suffered from syphilis. — Lymphatic new-formations. (See Vol. II, p. 173 and p. 222.)
- Fig. 7. A group of hepatic cells, in which the gradually advancing changes in the cells, resulting from the deposit of amyloid matter, may be traced.
- a.* Cell with distended nucleus;
  - b.* Uniform distention of the enlarged cell. The nucleus is no longer visible;
  - c.* Debris of the disintegrated cells.
- Fig. 8. Alteration of colour produced upon the cells, by the addition of solution of Iodine.
- Fig. 9. Further alteration produced by the addition of sulphuric acid as well as solution of Iodine.
- Fig. 10. A dense aggregation of hepatic cells, coloured with solution of Iodine.
- Fig. 11. A group of cells, with the degenerated branch of a vessel. (See likewise, Plate I, Fig. 3.)
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## P L A T E X I.

### ECHINOCOCCUS OF THE LIVER. DISTOMA HEPATICUM. PENTASTOMA DENTICULATUM. ALVEOLAR CANCER. MULTIPLE ECHINOCOCCI OF THE LIVER.

- Fig. 1. A small hydatid cyst projecting from the margin of the liver.
- Fig. 2. The same, magnified 12 diameters. Upon the inner surface of the capsule, which is composed of successive layers, are seen numerous, densely aggregated scolices, like little fungi (*b*). Externally this envelope is covered by the capsule of the liver (*c*). In the direction of the glandular substance, it is bounded by a moderately thick layer of connective tissue. The lobules of the liver, immediately adjoining, are flattened and separated from one another by fibrous bands.
- Fig. 3. Boundary layer of a suppurating colony of hydatids in the liver, which burst into the right lung. The portal vein is injected red and the hepatic artery, yellow. The capsule, which separates the hepatic parenchyma from the echinococcus, consists partly of crude connective tissue, and partly of connective tissue with branched corpuscles, aggregated together in rounded masses. The membrane derives numerous branches from the portal vein and particularly from the hepatic artery. The adjoining hepatic lobules are flattened; those more remote are perfectly normal. The branches of the hepatic artery contain much black pigment.
- Fig. 4. Isolated hooklets from the coronet of hooks.
- Fig. 5. Large and small hydatid vesicles.
- Fig. 6. Hydatid membrane composed of successive layers.
- Fig. 7. Multiple Echinococci, drawn from a preparation in the possession of Professor Luschka.
- Fig. 8. Distoma hepaticum, after Kuchenmeister.
- Fig. 9. Pentastoma denticulatum. (See Vol. II, p. 276.)
- Fig. 10. Alveolar Cancer of the Liver. — *a* Serous covering of the upper surface. *b* Lower surface. *c* The new-formation growing exuberantly from the upper surface of the liver.
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## PLATE XII.

### DISEASES OF THE PORTAL VEIN.

Fig. 1. Phlebitis lienalis and Pylephlebitis.

An abscess of the spleen (*a*) had forced its way into the splenic vein, which is filled with reddish-brown coagulum and yellow purulent fluid. A conical rounded coagulum extends through this vessel as far as the portal vein (*b*). The inner lining of the splenic vein is of a dirty yellow colour. *d* Pancreas. *e* Mesenteric vein. — † Splenic Parenchyma. \* Splenic Abscess. The branches of the portal vein in the liver, were filled partly with pus, and partly with firmly coagulated blood. (See Plate XIII, Fig. 2.)

Fig. 2. Obliteration of the Portal Vein.

A probe is passed through the constricted portion of the vessel, which is filled with firm coagulum. Close to it lies the open ductus choledochus. Four varices, of a dark blue colour are observed in the stomach (*a*).

Fig. 3. Fatty Degeneration of the walls of the Portal Vein.

Yellow spots are observed upon the inner surface of the tube of the vessel. The vessel itself, at the upper part is surrounded by an extensive extravasation of blood; below is observed a portion of the pancreas in a state of fatty degeneration.

Fig. 4. Adhesive Pylephlebitis.

A branch of the portal vein is completely obliterated. The liver at this place is marked by a cicatrix-like depression.

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## P L A T E XIII.

## DISEASES OF THE HEPATIC VEIN.

Fig. 1. Metastatic Deposits of Pus in the Liver.

The lobules of the liver can still be distinguished in the purulent deposits, which are surrounded by a blackish rim, and a grey margin. The liver towards its centre is yellow and soft, whilst its margins exhibit a dark tint. At those places, where the abscesses are in contact with the wall of the opened hepatic vein, the pus is seen through the coats of the vessel. At another part it is rough and covered with a layer of fibrine.

Fig. 2. Inflammation of the Portal Vein.

The divided branches of the portal vein are filled partly with dark coagulated blood and partly with yellow pus. (See Plate XII, Fig. 1.)

Fig. 3. Several abscesses in the liver, with great injection of the surrounding tissue. A branch of the hepatic vein is filled with firm coagulum.

Fig. 4. An inflamed hepatic vein, with its sheath at some places much thickened. Deposits, which are partly greyish-yellow, and partly dark and firmly adherent, are observed on the inner surface of the wall of the vessel.

Fig. 5. An obliterated hepatic vein, with a uniformly thickened wall. Greyish-yellow deposits are seen upon the lining membrane of the vessel. The trunk of the vena cava inferior (*a*) is thrown into folds by bridge-like processes of connective tissue, and likewise presents grey deposits upon its surface.

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## P L A T E   X I V .

### BILIARY CONCRETIONS.

Figs. 1, 2 and 3. Bile-pigment crystallised from chloroform.

Fig. 1. Prisms.

Fig. 2. Laminae.

Fig. 3. Needles.

Fig. 4. Brown pigment of bile, crystallised in needles, mixed with the epithelium of the gall-bladder.

Fig. 5. Various crystalline forms of carbonate of lime, from the mucous membrane of the gall-bladder.

Fig. 6. Pearl-like Gall-stones.

Fig. 7. Gall-stone composed of cholesterine, with a radiated structure and a calcareous shell.

Fig. 8. Crystalline Gall-stone, composed of cholesterine and covered with crystals of carbonate of lime.

Fig. 9. Large concretion, with a radiated nucleus of cholesterine and a laminated shell, composed of pigment in combination with lime. This calculus caused death by obstructing the small intestine.

Fig. 10. Gall-stone composed of pure cholesterine, of a crystalline laminated structure.

Fig. 11. Radiated cut surface of the same calculus, with a nucleus containing brown pigment.

Fig. 12. Calculus of cholesterine, with a cleft nucleus, radiated structure, and a crust composed of several layers.

Fig. 13. Radiated calculus of pure cholesterine, without any nucleus.

Fig. 14. Brown, flattened calculus, with an amorphous appearance on section.

Fig. 15. Angular, white calculus of cholesterine, with deposits of black pigment on the corners and edges.

Fig. 16. Mulberry-shaped calculus of black pigment.

Fig. 17. Reddish-brown, mulberry-shaped calculus, composed of crystals arranged in a radiated manner.

Fig. 18. White, mulberry-shaped calculus, with a nucleus containing pigment.

Fig. 19. Polyhedral calculus of cholesterine, with eroded angles and edges.

Fig. 20. Polyhedral greenish-brown calculus, with deep erosion, and exposure of the subjacent reddish-brown layers.

The two last figures illustrate the disintegration of gall-stones within the gall-bladder.

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III



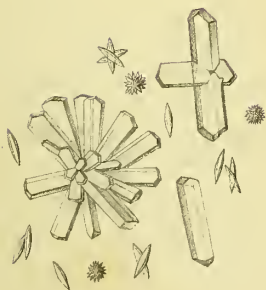
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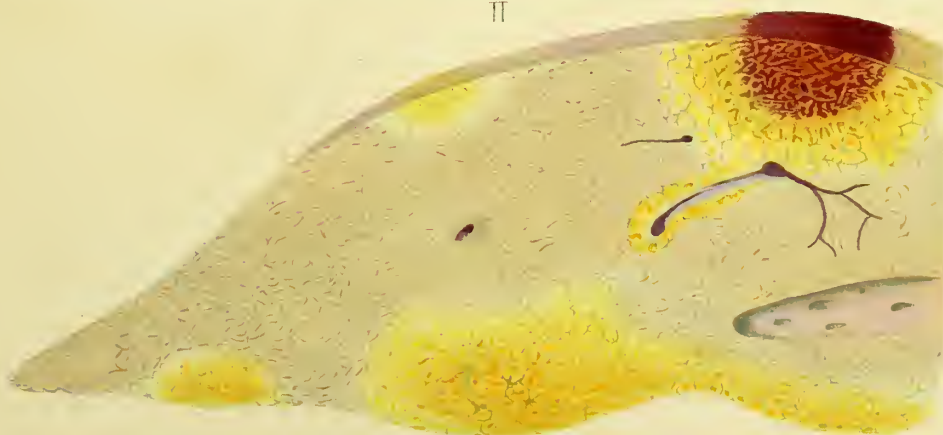
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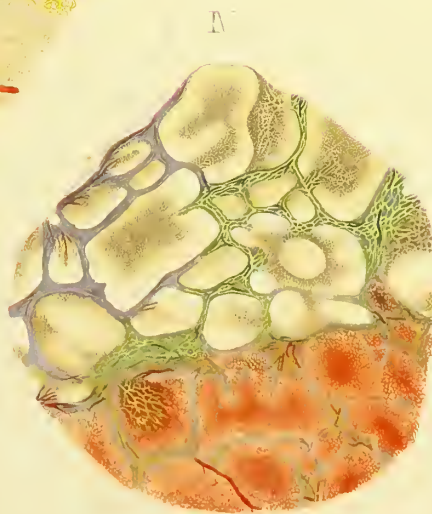
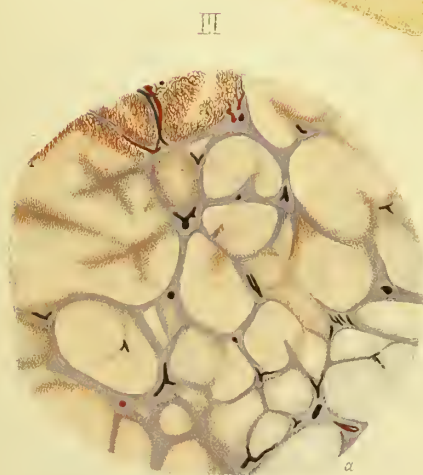
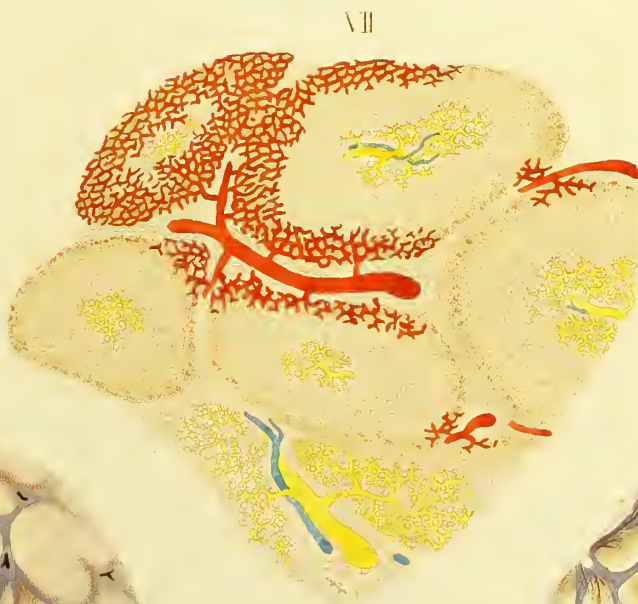
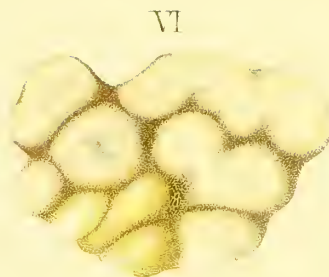
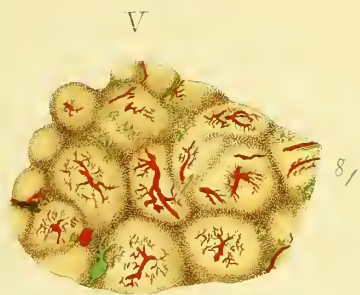
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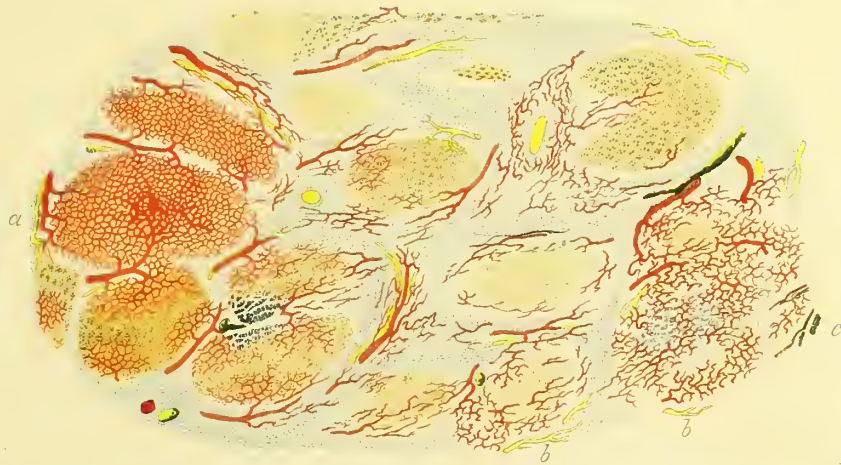




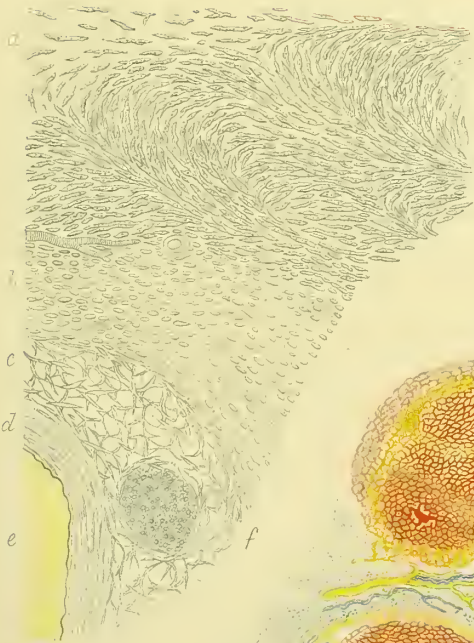




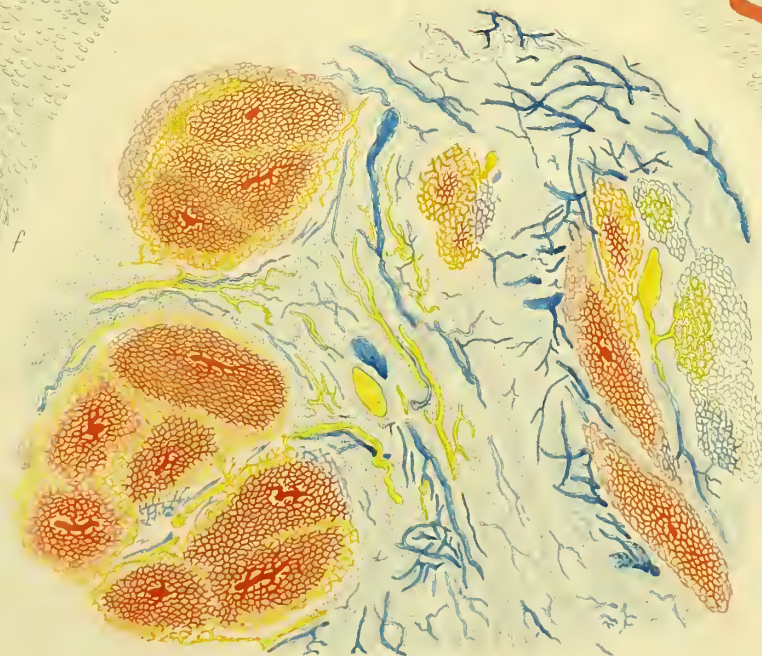
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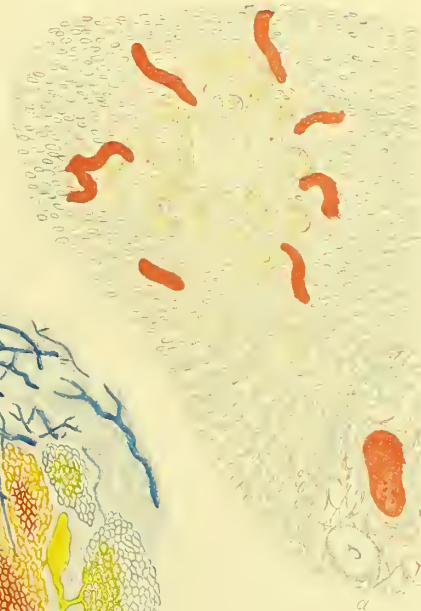
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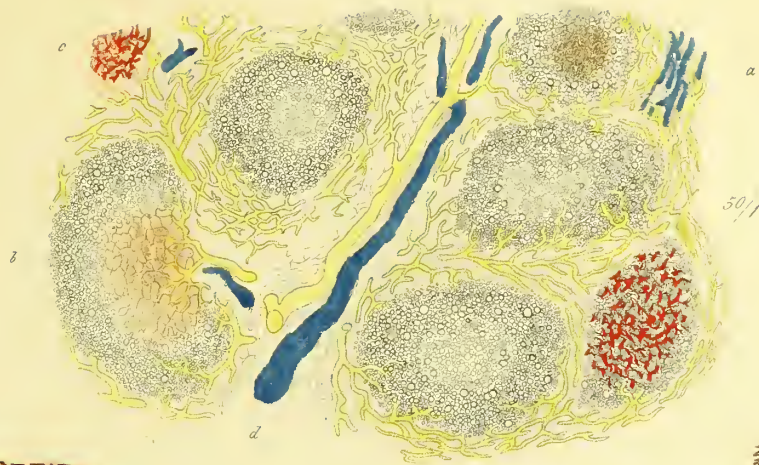
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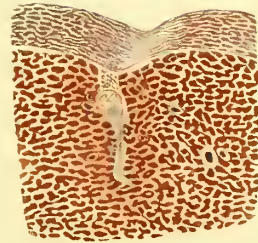
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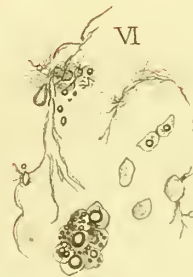
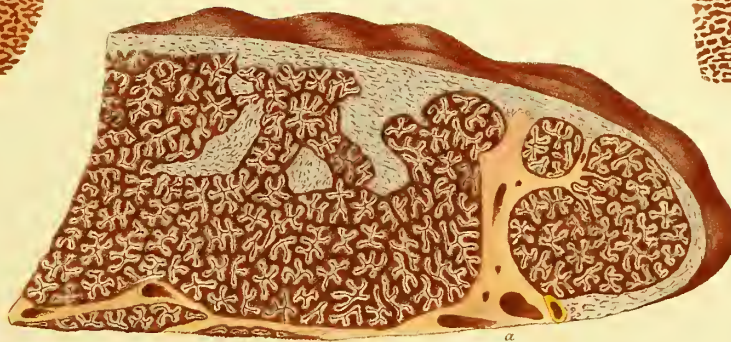
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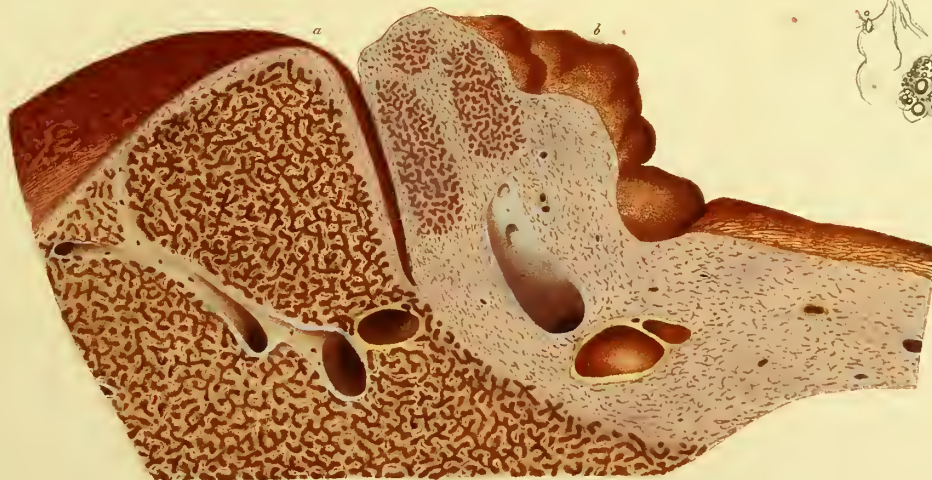
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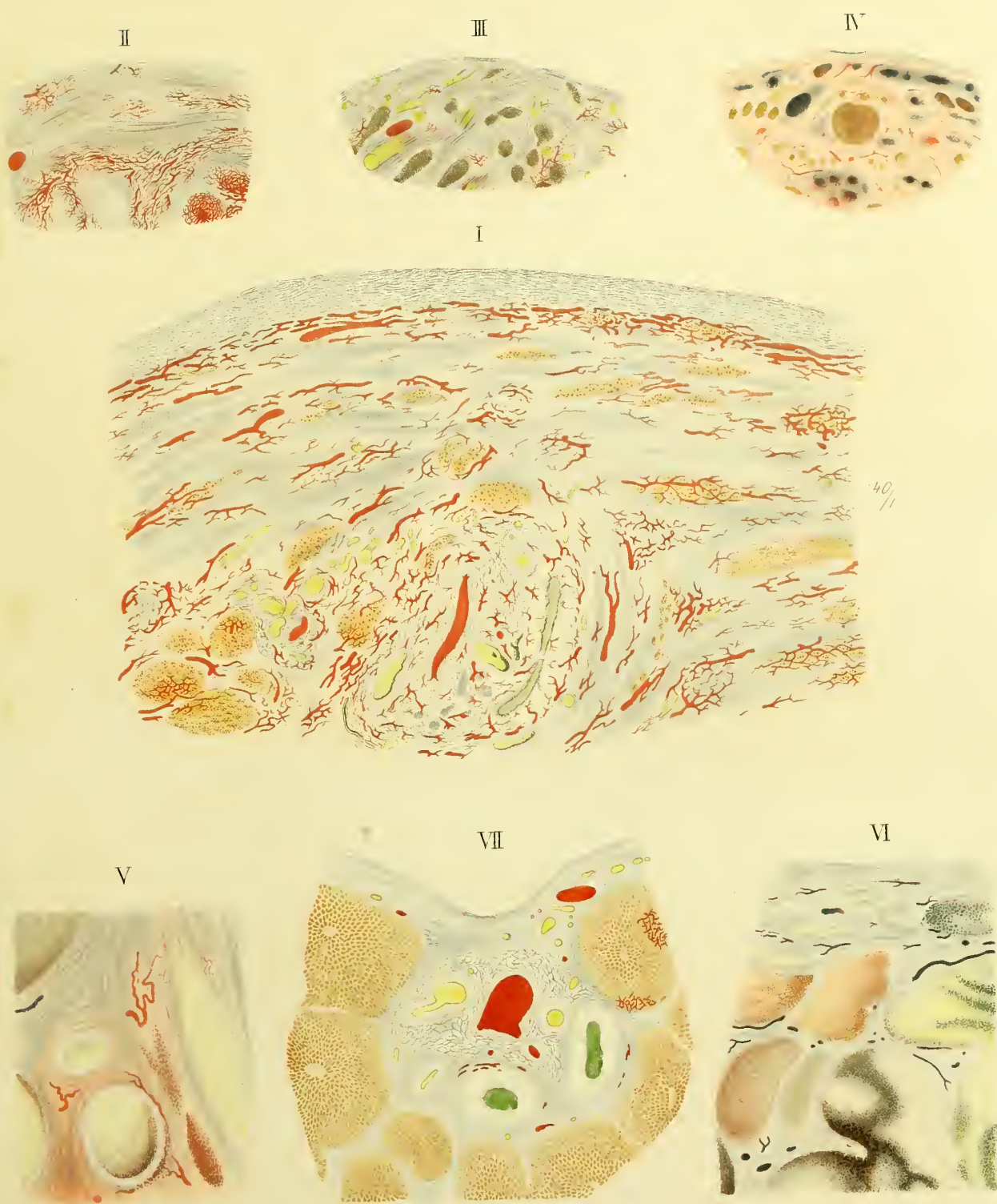


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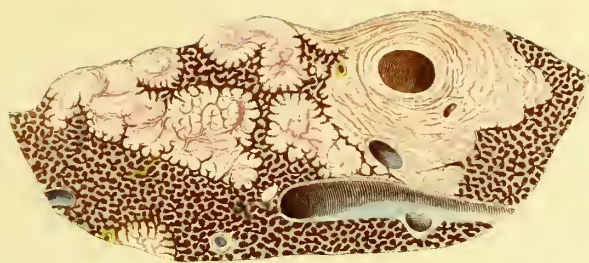




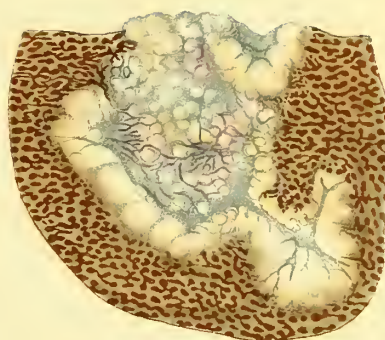




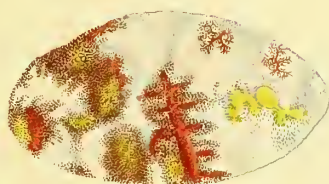
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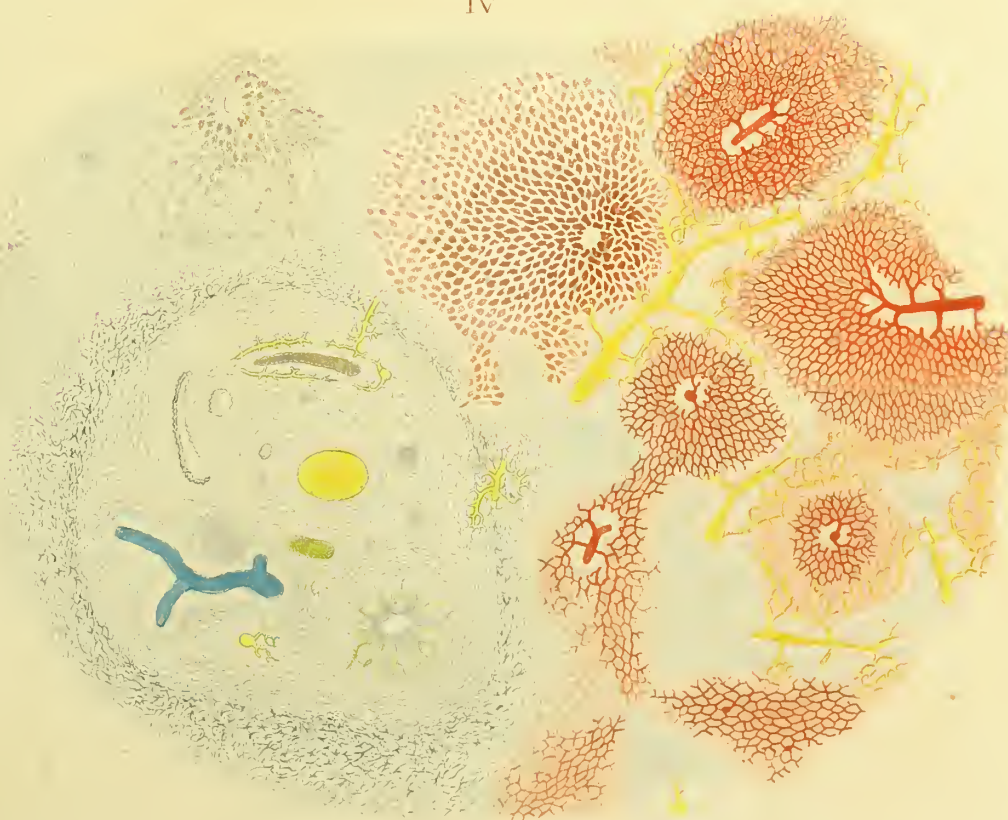
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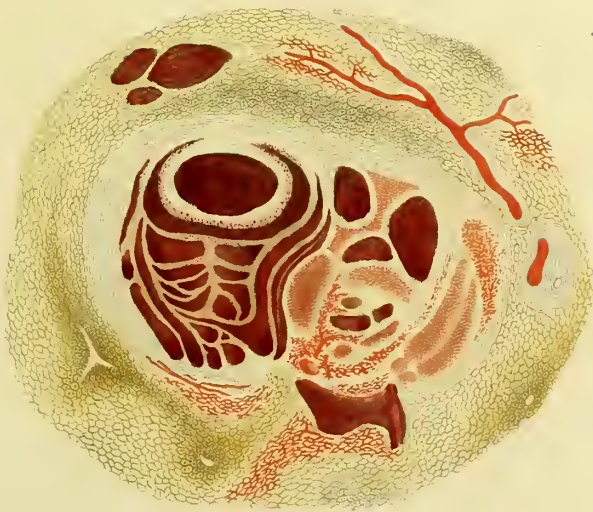




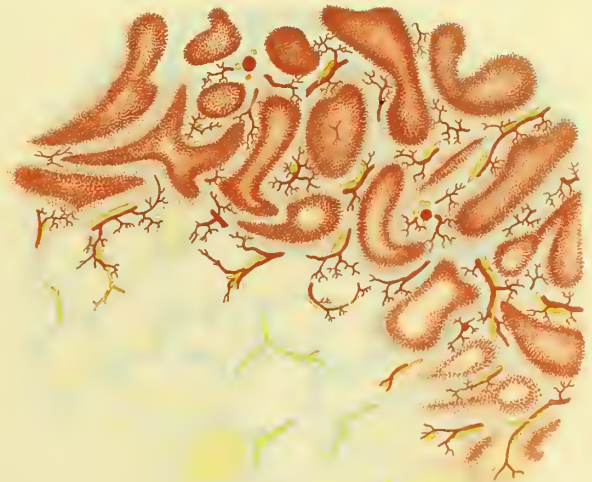
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III



II



*Amphioxus*

*Amphioxus*

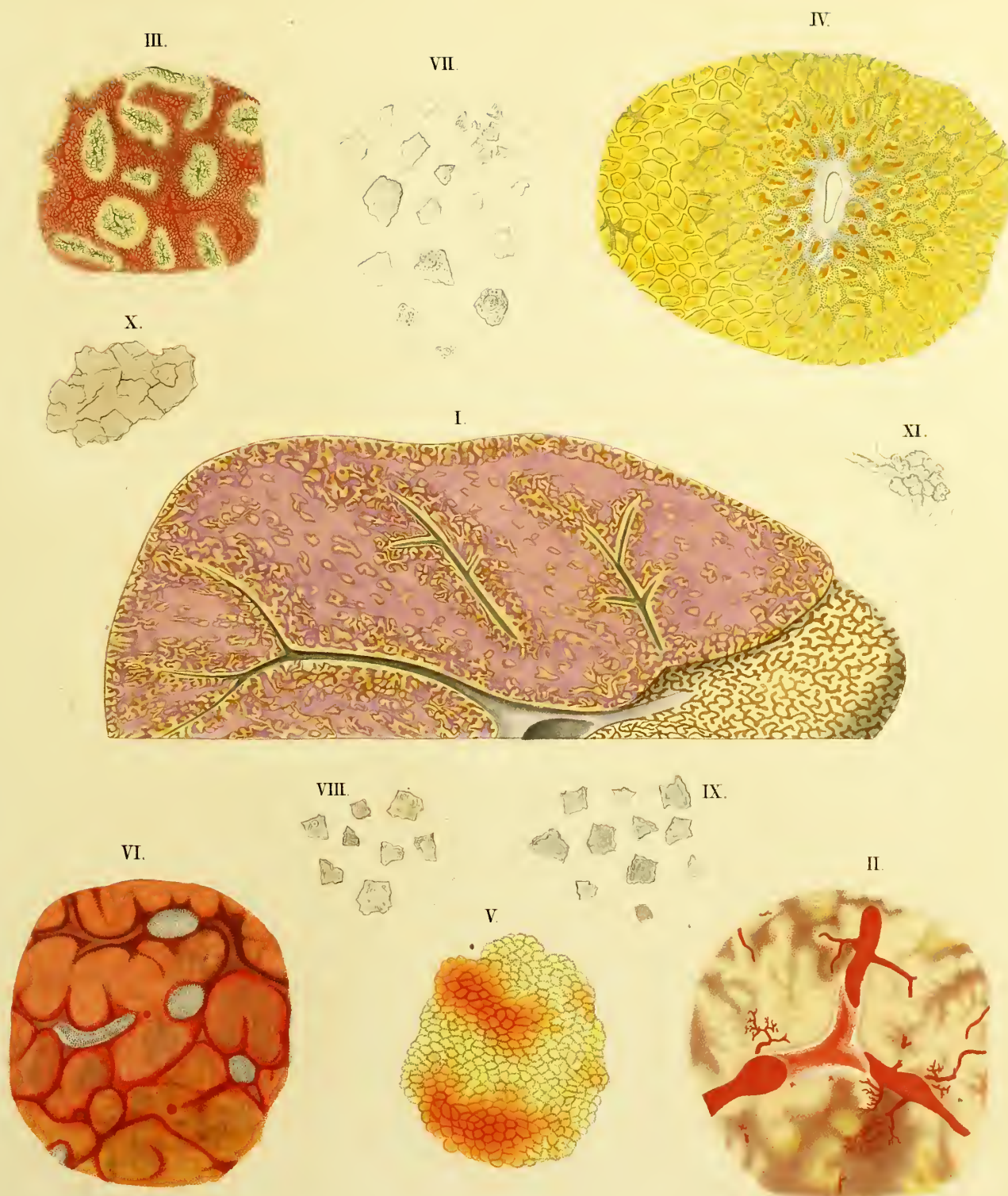






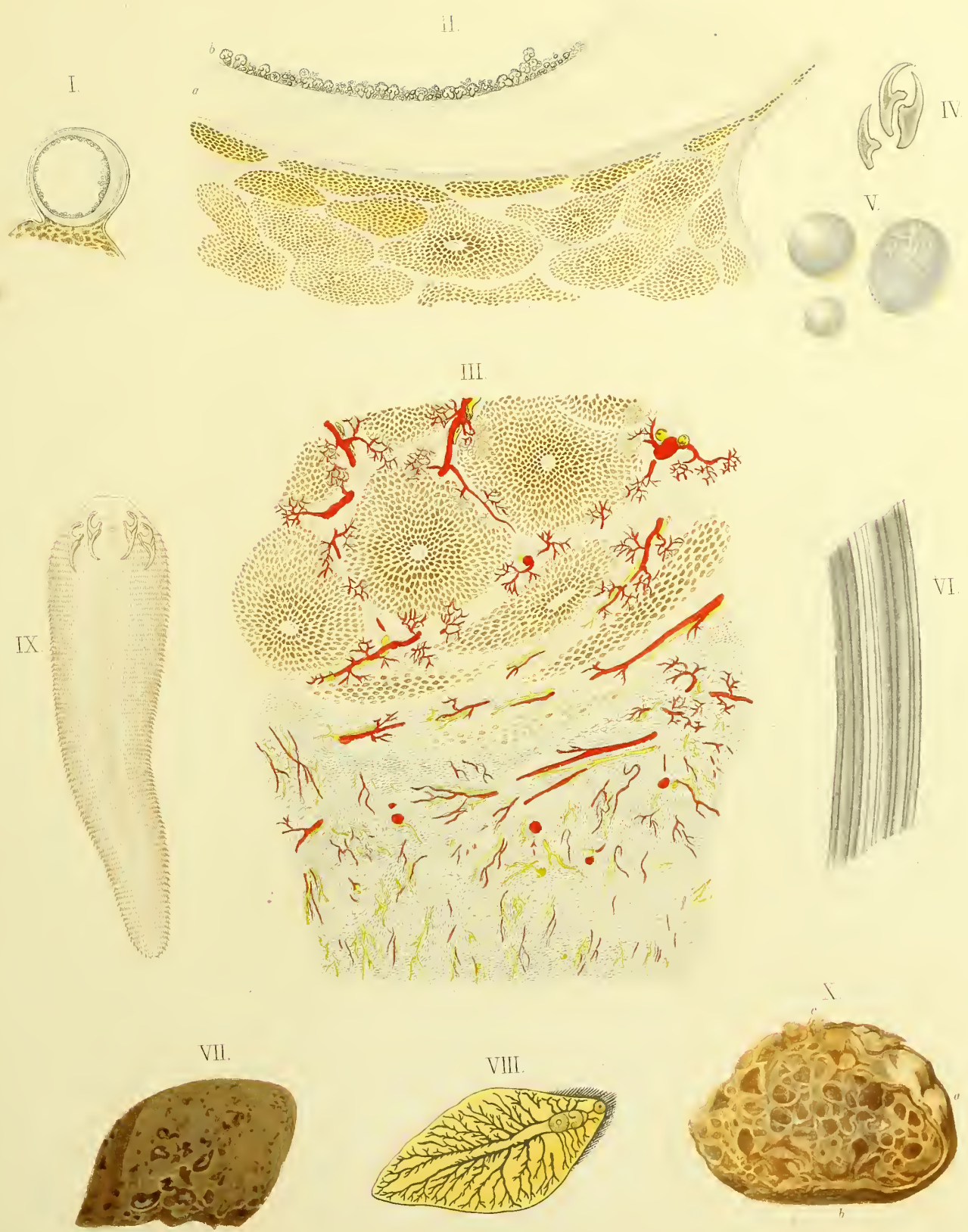








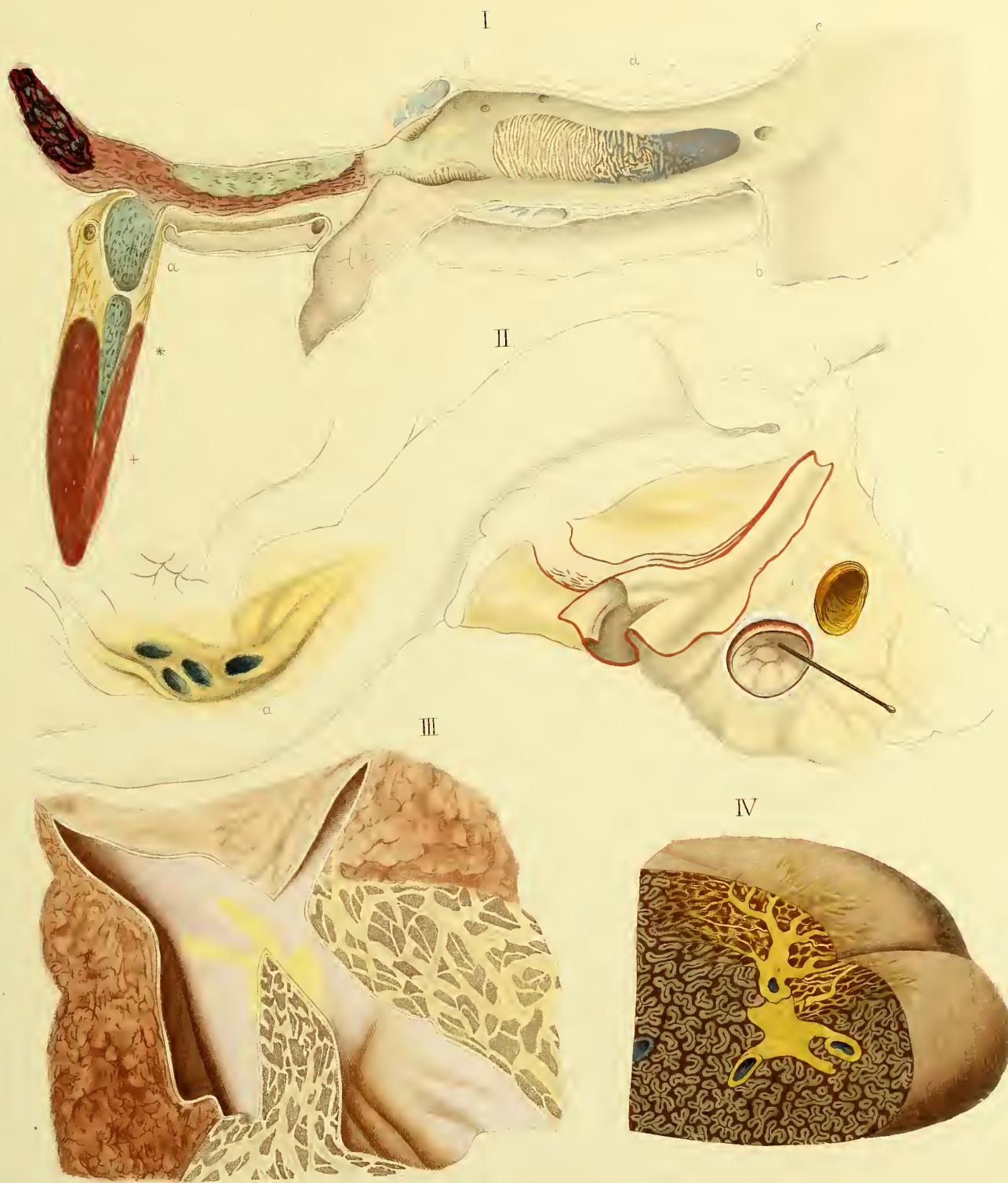




A Alsmann ad nat p. 10x







V. Querschnitt ad nat. pr.

Nach Parkmann's (Museum d. H. B. Museum)





A. Aschmann ad nat. pinx.

Small Fertilized Eggs of the Brachymeria













